

Arizona Functional Classification Guidelines

These guidelines summarize what one should consider when functionally classifying roadways once one has defined the major traffic generators to be served by a roadway network. These are broad guidelines that are to be applied with full adherence to the Federal Highway Administration's (FHWA) direction regarding the relative proportion of arterial, collector and local mileage within a state's urban and rural road systems

Background

The 1991 Intermodal Surface Transportation Act required each state to functionally reclassify its public roads and streets; ADOT was assigned to lead Arizona's effort. The initial step in this process was to update urban area boundaries for urbanized and small urban areas by mid-1992. The new functional classification of Arizona's public roadways was completed in December 1992. Arizona's submission was reviewed and approved by the Federal Highway Administration (FHWA) and the Secretary of Transportation, and reported to Congress in 1993.

Extensive coordination with other entities was essential throughout the process of updating urban boundaries and the functional reclassification. ADOT worked with Colorado, New Mexico, and Utah to assure continuity of arterial routes across state lines. The Phoenix, Tucson, and Yuma metropolitan planning organizations (MPOs) were fully involved in the reclassification. ADOT worked closely with the MPOs to ensure continuity at the urban boundaries and provide assistance as needed. Arizona's rural councils of governments (COGs) were consulted to provide input on functional reclassification within their jurisdiction. ADOT and the COGs coordinated with Indian reservations to reclassify roads on their lands. The Bureau of Indian Affairs provided considerable assistance with these efforts. ADOT coordinated with the U.S. Forest Service and the National Park Service, including officials at regional offices and individual parks and forests. Close coordination with the FHWA continued throughout the effort.

The Federal Highway Administration's **Highway Functional Classification: Concepts, Criteria, and Procedures** (revised March 1989) was the principal reference for Arizona's reclassification. ADOT employed the procedures suggested in this document. While differences exist between the procedures for rural, small urban, and urbanized area classification, all adopt a "top down" approach that delineates the highest functionally classified roadways first and then works progressively down the hierarchy of functional systems to conclude with the classification of local roads and streets. ADOT started this "top down" approach by identifying the most important internal and external traffic generators for Arizona. The procedure enabled ADOT to functionally classify the State Highway System and share that information to facilitate efforts by the MPOs and COGs.

Using the "top down" functional classification method worked well in conjunction with FHWA limitations on the distribution of roadways to arterial and collector systems. Once ADOT functionally classified Arizona's rural arterial system, the principal tasks remaining were to identify

the rural collector system and distinguish major and minor collectors. Once these tasks were accomplished the local road system was identified as all roads not assigned to a higher system.

The ADOT functional classification of urban state highways provides a starting point for the classification of roads and streets in urban clusters and urbanized areas. Using the guidelines presented here, the “top down” approach assigns urban arterial mileage until exhausting legitimate arterial candidates or reaching the arterial system mileage limit. Urban collector system assignments continue in a similar fashion. Once urban collector candidates are exhausted or achieve the urban collector system mileage limitation, the urban collector system is defined. This, in turn, also identifies the local street system defined as all urban streets not classified as arterial or collector.

Future Roadway Use and Future Routes

In general, the functional classification assigned a road or street remains a stable characteristic, particularly in the short term. For the 1992 functional reclassification, only proposed roads and streets that were in an approved short range improvement program and expected to be under construction by 1998 were to be functionally classified.

What Roads Are a Part of the Functional Classification Process?

All roads that are a part of the public road system are to be functionally classified as an integral system regardless of jurisdictional control of those roads. In other words, state highways, county roads, city streets, National Forest Service roads, BIA roads, etc. are all part of the public road system. The classification process does not consider administrative or jurisdictional systems. The only way roads are separated into different functional classification systems is by their geographic location in rural, small urban, or urban areas.

Rural Functional Classification

What Territory is included in the Rural Functional Classification?

The rural area of the state consists of all territory outside of the urban (FHWA-adjusted) boundaries for urban clusters (e.g., Kingman, Payson, Nogales) and urbanized areas (Flagstaff, Phoenix, Tucson, and Yuma).

Do the COGs Functionally Classify all roads in the rural areas?

No. Note the following significant exceptions:

- ADOT is responsible for classifying state highways in rural areas. The COGs do not classify the State Highway System.
- Federal agencies classify federal roads within their jurisdictions.
- The Bureau of Indian Affairs (BIA) classifies roads for some of the American Indian Reservations. The COG needs to seek guidance from the BIA, with input from the respective Tribe if necessary, for any roads it wishes to reclassify/classify in these areas. During the 1992 Functional Classification for Arizona the BIA classified the roads in the following jurisdictions: Navajo Nation, Hopi, San Carlos Apache, White Mountain Apache, Tohono O'odham, and Gila River. In most cases the COG will be responsible for classifying the roads on the American Indian Reservations.

What is the FHWA Guidance Regarding the Proportion of Total Rural Mileage Assigned Each Rural Functional Classification System?

The guidelines are presented in the following table. Note that the rural collector and local road systems combined should account for between 85% and 95% of total rural mileage. The total rural arterial mileage is to fall between 6% and 12 %. However, the FHWA guidelines add that this mileage total should fall in the 7% - 10% range for most states.

FHWA Guidelines Regarding the Extent of Rural Systems	
Rural System	Percentage of Total Rural Mileage
<i>Principal arterial system</i>	2% - 4%
<i>Principal plus minor arterial system</i>	6% - 12%
<i>Collector street system</i>	20% - 25%
<i>Local street system</i>	65% - 75%

Do the COGs Need to be Concerned with Every Rural Functional Classification Category?

Because direction from the FHWA limits the amount of mileage that can be classified in certain categories, *the COGs are highly unlikely to classify rural roads as anything other than major collectors, minor collectors, and local roads.* Remember that the rural arterial mileage should account for 6% to 12% of **all** rural public road mileage. This is equivalent to 2,213 - 4,427 miles out of a total of 36,889 (CY2000 data) rural public roads in the state. Just the rural portion of the State Highway System consists of 5,819 highway miles, well over the limit. This means that many of the State Highway System miles have to be classified as arterials on Arizona's rural collector system. *As of CY2000, 2,216 miles of state highways are designated either major or minor collector facilities.* Given the restrictions on total rural arterial mileage, rural public roads off the State Highway System will find it extremely difficult to achieve arterial status.

Criteria Used to Functionally Classify Rural Arizona Roads

Rural Principal Arterial Highways

Arizona's principal arterial highways are identified as follows:

- All Interstate highway mileage is included.
- Principal arterials serve:¹
 - ◊ all urban areas with a population of $\geq 50,000$;
 - ◊ a large majority of urban areas with a population of $\geq 25,000$;
 - ◊ the principal corridors of interstate travel. There are relative few corridors used by travelers when journeying to and from neighboring states and Mexico.
 - ◊ the principal corridors for statewide travel. That is principal arterials serve the very highest volume, long distance trips within Arizona.
- In addition, the rural principal arterial system forms an integrated network without stub connections, except where unusual geographic or traffic flow conditions dictate otherwise (for example, international boundaries, connections to coastal cities).

Principal arterials:

- provide high speed travel.
- provide minimal interference to through movement.
- are to be appropriately spaced apart.
- constitute no more than 4% of rural mileage statewide.
- are the most traveled, long-distance rural roads. They should account for 30%-55% of rural VMT

¹. The FHWA manual, Highway Functional Classification: Concepts, Criteria and Procedures offers as a guide the following definition of rural principal arterial service: the rural principal arterial system may be considered to "serve" an urban area if the system either penetrates the urban boundary or comes within 10 miles of the center of the place and is within 20 minutes travel time via a minor arterial highway.

The non-Interstate routes identified as principal arterials ranked highest in terms of the following combination of factors:

- Access to very important traffic generators not currently served by Arizona's Interstate Highways (e.g., Las Vegas and Salt Lake City).
- Volume of commercial traffic, particularly heavy truck traffic. (This measure is indicative of major trade corridors not served by the Arizona's Interstate highways.)
- Total traffic volume.
- Vehicle miles of travel.

Rural Minor Arterial Roads

Rural minor arterials:

- serve most of the larger communities not served by the principal arterial system.²
- serve other traffic generators capable of attracting travel over long distances as do the larger communities.
- form an integrated network.
- provide interstate and intercounty service.
- provide trip length and travel density greater than those served by collector systems.
- provide relatively high travel speeds.
- minimize interference to through movement.
- FHWA guidelines restrict the combined total principal arterial and minor arterial mileage to the 6-12 percent range, with most states falling in the 7-10 percent range.

Following rural principal arterials, minor arterials are the most heavily traveled rural highways. Minor and principal arterial mileage should account for 45%-75% of all rural VMT.

Arizona's Rural Collector System

- Serve travel of intracounty and regional importance, rather than statewide importance.
- Regardless of traffic volume, travel distances are shorter than on arterial routes.
- Posted speed limits tend to be more moderate than those on arterial highways.
- All rural state highways that are not arterial highways will be on the rural collector system.

Rural Major Collector Roads

- Provide service to any county seat not on an arterial route.
- Provide service to the larger communities not directly served by the higher systems.

² Rural minor arterial service is provided when the minor arterial system either penetrates or comes within two miles of the urban boundary.

- Serve other traffic generators of the greatest intracounty importance equivalent to towns. Examples are: consolidated schools, shipping points, regional parks, important mining and agricultural areas, etc.
- Serve the principal business area or a concentration of community facilities in rural communities with a population of between 500 and 5000.
- Rural major collectors tend to connect to rural arterials.

Rural Minor Collector Roads

- Are spaced at intervals consistent with population density.
- Collect traffic from local roads. Tend to feed predominantly residential traffic from side streets into major collectors or arterials.
- Bring all developed areas within a reasonable distance of a major collector or higher classification road.
- Tend to have lower traffic volumes than major collectors.
- When a minor collector carries as much traffic volume as a major collector, it tends to:
 - ◊ carry traffic over a shorter distance than a major collector;
 - ◊ carry traffic on trips to less important intracounty traffic generators; or
 - ◊ the route parallels a route of higher classification.³

Rural Local Roads

- Rural local roads will comprise all rural roads that do not meet the criteria for arterial and collector systems.
- According to the FHWA manual the local road system should account for 65%-75% of all rural miles statewide and between 5%-20% of all rural VMT.
- Rural local roads serve primarily to provide access to land uses adjacent collector and arterial roadways.
- The main function of most local roads is to get to and from residences.
- Rural local roads may also serve some scattered business and industry, and land uses generating modest traffic.
- Tend to have lower traffic speed limits.
- Tend to have lower traffic volumes.
- Cul-de-sacs are usually local roads.
- Most, but not all, unpaved roads tend to be local roads.⁴

Additional Considerations

³ ADOT distinguishes the functional classification of parallel routes. The convention employed is that the more important route is assigned a higher functional classification.

⁴ See text discussing rural minor collectors for notable exceptions.

- The more important traffic generators typically generate more traffic. Thus, current ADT and VMT are potential indicators of the importance of the roadway for the county, region, or state.
- Arterial highways roads should be connected to routes of the same or higher functional classification at both termini.
- All collector routes should be connected to routes of the same or higher functional classification at one or both termini.⁵
- By definition, collector status implies a level of traffic greater than neighboring local roads since the collector gathers traffic from these roads.
- A very short road may function as a major collector if it is serving one of a county's major traffic generators.
- A rural, non-arterial road that is at least a mile in length and which carries a high volume of commercial vehicles (i.e., >10 percent) is likely to be a major collector.
- A road whose principal function is to provide residential access can be said to be a collector when the both size and density of the residential development served is more characteristic of urban areas.
- In rural Arizona we would expect the minimum ADT for major collectors to range from 600-800 vehicles per day. In unique circumstances (i.e., the central business area of a town) it may be somewhat lower.
- We would expect the minimum ADT for minor collectors to be 300-500 in most cases. For longer roads (e.g., 5 or more miles in length), the minimum may be 200.
- One very typical characteristic of a local road is that the road is not the preferred route by travelers to traffic generator roads of intracounty or greater importance.
- A long road carrying little traffic (e.g., less than 200 vehicles per day) is not a collector route. Generally these roads are forest service roads, jeep trails, or access to low-use recreation areas, scattered farms, ranches, or other residences in very rural areas. They function to link minor traffic generators with the collector and arterial systems. They are not serving the more important county-level or higher traffic generators.
- The classification of a rural non-arterial road crossing the Arizona border must take into account the nature of traffic generators in the adjacent state and the functional classification assigned by the neighboring state.

Some Final Suggestions for Classifying Rural Roads

- Remember, the higher the functional classification, the lower the percentage of mileage. For instance, principal arterials account for 2-4 percent of all mileage in most states. In contrast, local roads account for 65-75 of all mileage in most states.
- **As a general rule, minor collectors should account for more mileage than major collectors, while the total local roadway mileage should be triple the combined mileage of minor and major collector roads.**
- The FHWA requires that a route should be connected to routes of the same or higher classification at both ends. This rule should be followed to the greatest extent possible.

⁵ In certain instances, unusual geographic or traffic flow conditions may dictate a stub route.

However, in hilly terrain, some minor collectors may connect at one end of the route to a local road, especially if many local roads feed into the minor collector for access to roads of higher classification. Exceptions to the rule should be due to geographical limitations only.

Urban Functional Classification

What roads are part of the urban functional classification process?

All public roads that are within an urban area. An “urban area” is defined as an urban cluster and/or urbanized area.

What direction does the FHWA provide regarding the distribution of Urban Roadway Mileage Distributed to each Urban Functional Classification System?

The guidelines are presented in the following table. Note that the urban collector and local street systems combined should account for between 70% and 90% of total urban mileage, with the collector system contributing no more than 10% of this total.

FHWA Guidelines Regarding the Extent of Urban Systems	
Urban System	Percentage of Total Urban Mileage
<i>Principal arterial system</i>	5% - 10%
<i>Principal plus minor arterial system</i>	15% - 25%
<i>Collector street system</i>	5% - 10%
<i>Local street system</i>	65% - 80%

Do the COGs Need to Functionally Classify All Roads in the Urban Areas?

No, there are some exceptions:

- The COGs do not need to classify the State Highway System in urban areas.
- The incidence of federal roads within urban boundaries is likely to be rare. However, as with rural functional classification, ADOT will work with the federal agencies to classify federal roads within their jurisdictions.
- Functional Classification changes for urban clusters on any of the American Indian Reservations will be coordinated with the BIA and the respective Tribe.

Does each urban area have to meet the percentage guidelines for urban functional classification?

The two larger urbanized areas (Phoenix and Tucson) are each sufficiently large enough to be able to conform to the guidelines individually. The small urban clusters are to strive to meet the guidelines as much as possible. Ultimately all urban areas - both urbanized and urban clusters - should meet the guidelines. Remember, the percentages must be maintained for on a statewide basis.

Criteria Used to Functionally Classify Urban Arizona Roads and Streets

Urban Principal Arterials

- There are three types of urban principal arterials:
 - ◊ Interstate;
 - ◊ other freeways and expressways; and
 - ◊ other principal arterials with no or little control of access
- *The primary function of these roads is to provide the greatest mobility for through movement. Any direct access to adjacent land is purely incidental.*
- The higher mobility associated with these facilities are associated with higher posted speed limits.
- Partially or fully controlled access facilities are generally urban principal arterials.
- In larger urban areas the spacing of principal arterials may vary from less than one mile in the highly developed central business areas to five or more miles in the sparsely developed urban fringes.

In both urban clusters and urbanized areas, the principal arterial system should:

- serve the highest traffic volume generators;
- carry trips of longer length (The principal arterial system distributes traffic to the greatest geographic area);
- have a high proportion of the urban area travel on a minimum of mileage.
- be integrated, internally and between major rural connections.
- carry the major portion of the trips entering and leaving the urban area.
- provide continuity for all rural arterials that intercept the urban boundary (of both urban clusters and urbanized areas).

For urbanized areas, urban principal arterials should also:

- serve the major centers of activity of a metropolitan area;
- provide connections between central business districts, between major inner city communities, and major suburban centers.
- carry the major portion of traffic seeking to bypass the central city.
- frequently carry important intraurban and intercity bus routes.

Urban Minor Arterials

- If an urban connection to a rural collector road is not classified as an urban principal arterial, it should be classified as an urban minor arterial.
- The spacing of minor arterial streets can vary from less than a half mile in the central business district of large cities to 2-3 miles in the suburban fringe. *In fully developed areas, minor arterials should be no more than one mile apart.*

In urban clusters and urbanized areas, the minor arterial system should:

- provide trips of moderate length
- provide trips of lower travel mobility than urban principal arterials
- consequently, the speed limit is lower on these roads than on urban principal arterials.

In urbanized areas, urban minor arterials:

- are likely to carry local bus routes;
- serve to accommodate longer trips within the community; and
- do not usually penetrate identifiable neighborhoods.

Urban Collectors

Urban collectors:

- distribute traffic from arterials.
- funnel traffic collected from local streets into the arterial system.
- Collector systems may penetrate residential neighborhoods.
- Frontage roads should be classified as collector or local roads. (Frontage roads are to classified independently of the controlled access facility they abut.)

Urban Local Streets

- The primary function of the urban local street system is provide direct access to abutting land
- Urban local streets provide access to higher functional systems.
- Typically, service to through traffic movement is deliberately discouraged via the low posted speed limit, the use of stop signs, etc.
- Thus, urban local streets provide the lowest travel mobility.
- These streets have the lowest posted speed limits
- Generally, bus routes do not use urban local streets.
- Urban local streets comprise all streets not on one of the higher systems.

Continuity for Rural Routes Through Urban Areas

- Urban principal arterials provide continuity for rural principal and minor arterial routes.
- The routing of the urban link connecting a rural principal arterial should normally be fairly direct.
- The routing of the urban link connecting a rural minor arterial may be somewhat less direct.
- Urban Interstate routes provide continuity for the rural Interstate system.
- Other freeways and expressways provide connecting links for either non-Interstate rural principal arterials or rural minor arterials.
- Other urban principal arterials provide connecting links for either non-Interstate rural principal arterials or rural minor arterials.